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EDWIN DUNKIN, F.R.S., President, in the Chair.

Professor C. H. Brewitt Taylor, Foo-Chou Arsenal, China, was balloted for and duly elected a Fellow of the Society.

The Astronomer Royal desires to give notice that having several spare copies of Col. Tennant's "Report on the Transit of *Venus*, 1874" in stock at the Royal Observatory, he will be willing to present copies to any Fellows of the Society who may wish for them, on their making application to him for the same.

On the Right Ascensions of the Cape Catalogues, 1850, 1860, *and* 1880. By E. J. Stone, M.A., F.R.S.

The comparisons which Mr. Downing has made between the Right Ascensions of the Cape Catalogue, 1880, and those of the Melbourne Catalogue for 1870 (*Monthly Notices*, March 1885, page 301), is some real test of the freedom of the Catalogues compared from systematic errors. The epochs of the two Catalogues are only separated by ten years, and, in most cases, material exists for an approximate determination of the proper motions of the stars. It will be seen that the result justifies the statement which I made in *Notices*, January 1885, that the Right Ascensions made with the Transit Circles of the Melbourne and the Cape were either free from systematic errors, or affected with sensibly equal errors depending upon N.P.D.

But the comparisons which Mr. Downing has made between the Right Ascensions of the Cape Catalogues, 1850, 1860, and 1880, cannot be regarded as reliable tests of the existence of systematic errors in these Catalogues.

This is not due to any want of care or skill on Mr. Down-

ing's part, but to the absence of reliable data. It is impossible to determine the proper motions of the Southern stars contained in these Catalogues with sufficient accuracy to allow the Right Ascensions of the stars to be brought up over periods of twenty or thirty years with a precision which will justify the assumption that differences thus found are due to instrumental defects. For my own part I seriously doubt the legitimacy of such assumptions for the much more frequently observed stars within the reach of our principal northern observatories; and the conclusion to which Mr. Downing has been led (*Notices*, March 1885, page 315), that the proper motions of the clock-stars are not yet sufficiently well determined to allow of their Right Ascensions being brought up for a period of twenty years, is, I venture to think, a sufficient justification of my doubts.

But if these comparisons between the Cape Catalogues, 1850, 1860, 1880, were reliable, then the differences which Mr. Downing has given between the Right Ascensions of the 1880 Catalogue and those for 1850 and 1860 could not be due to errors in the 1880 Catalogue dependent upon N.P.D.

For these comparisons indicate that the Right Ascensions of the Southern stars in the 1880 Catalogue are too *small* relatively to those of the stars near the Equator by about a tenth of a second of time, when compared with the Right Ascensions of the 1850 Catalogue, whilst they are *too large* by about a tenth of a second of time, when compared with the Right Ascensions in the 1860 Catalogue, in the indirect manner adopted by Mr. Downing. Now the Right Ascensions of the Cape Catalogue, 1880, may be either too small or too large, but they certainly cannot be both too small and too large.

I have no hesitation in expressing an opinion that these differences are chiefly due to imperfections in the carrying out of the comparisons.

But as the results of the Cape Catalogue, 1860, are, in my opinion, of great accuracy, and tables of differences, such as those given by Mr. Downing, may lead to false impressions of the accuracy of the results contained in the two Catalogues compared, I have thought it desirable to test the reality of the somewhat large residual difference found for the zone N.P.D. 139° to N.P.D. 156°.

I have found seventy-five stars in the Cape Catalogue for 1860 which have proper motions adopted for them in Right Ascension, in the Melbourne Catalogue, 1870; I have brought up the Right Ascensions of these stars from 1860 to 1880 with these adopted proper motions. The difference which I thus find is only $+0^{s}\cdot05$. But even this small quantity would be diminished if, in the determination of the Melbourne proper motions, Powalky's re-reduction of Lacaille's observations had been used instead of the uncorrected results. I have not, however, thought it worth while to pursue the point further. Powalky has made his re-reduction differential with respect to Bradley's observations as reduced by Bessel; and as Auwers has

shown that these results require some not inconsiderable alterations, it would appear that some further modifications of Powalky's corrections must also be required. I have, however, given one other test of the accuracy of the Right Ascensions of the 1860 Catalogue. I find in the same zone eighty-four stars which are also contained in the 1840 Catalogue. I have, therefore, brought up the Right Ascensions of the 1860 Catalogue to 1880, with the proper motions found for the 1840 and 1880 Catalogues. The mean difference thus found is only $+0^{s}\cdot03$.

Such quantities as these are certainly not larger than those which will be found to result from similar comparisons between the best existing catalogues if separated by intervals of twenty years.

On the Diameters of the Sun and Moon as observed with the Greenwich Transit Circle. By W. G. Thackeray.

(*Communicated by A. M. W. Downing.*)

In one of the numerous sections of "Greenwich Observations" are yearly given the results of the comparisons of the diameters of the Sun and Moon, as computed by the *Nautical Almanac* Office, and as observed with the Greenwich Transit Circle, in the form of error of the *Nautical Almanac* diameter, and the mean of all these errors for the year, with the number of observations on which the value depends, is given in the several introductions.

A discussion of these errors, for several years previous to 1864, led to the adoption of a correction of $-0''\cdot53$ to the computed value of the *Nautical Almanac* semi-diameter of the Sun in all cases whenever a single limb only was observed, and this correction, which has continued to accord with the mean annual error year by year, has been still applied up to the present time whenever necessary. While casually looking into the observations on which this correction has been founded, I was drawn into an inquiry as to what is the mean value of the diameter of the Sun and Moon, given by all the observations made with the Greenwich Transit Circle, and what is the special value given by each of the regular observers? In other words, what is the amount of personality hidden away under this uniform annual mean?

The following Tables I. and II. are formed by extracting directly from the several volumes of "Greenwich Observations" the mean annual errors of the *Nautical Almanac* horizontal and vertical diameters of the Sun and Moon, with the number of observations on which they depend, so that the resulting value of the diameter is one which depends on a long series of observations made by various observers, and spread over a number of years.

Tables III. and IV. are formed by taking from one of the planetary sections the daily errors of the *Nautical Almanac*